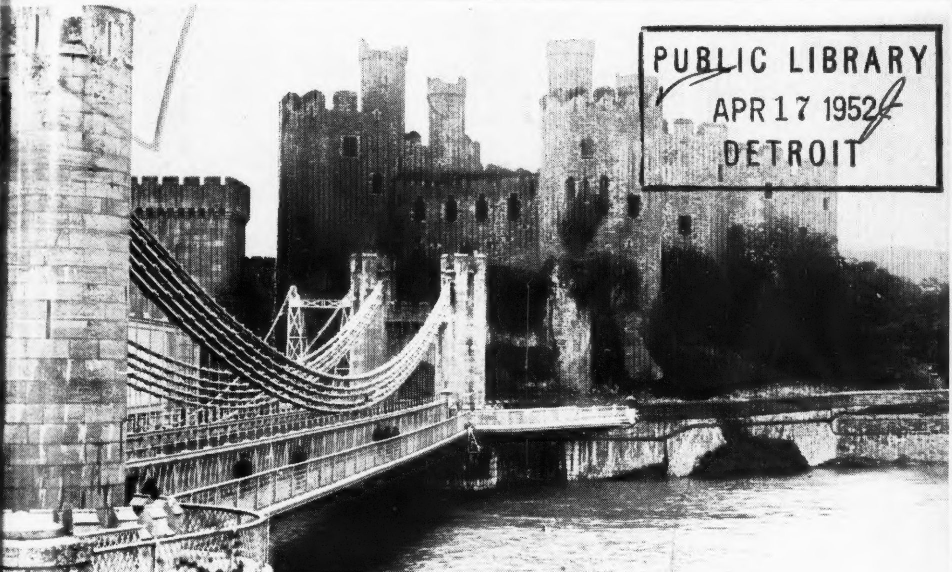
Light and Lighting

Industrial, Commercial, Highways, Domestic, etc.

Vol. XLV.—No. 4. APRIL, 1952 One Shilling and Sixpence



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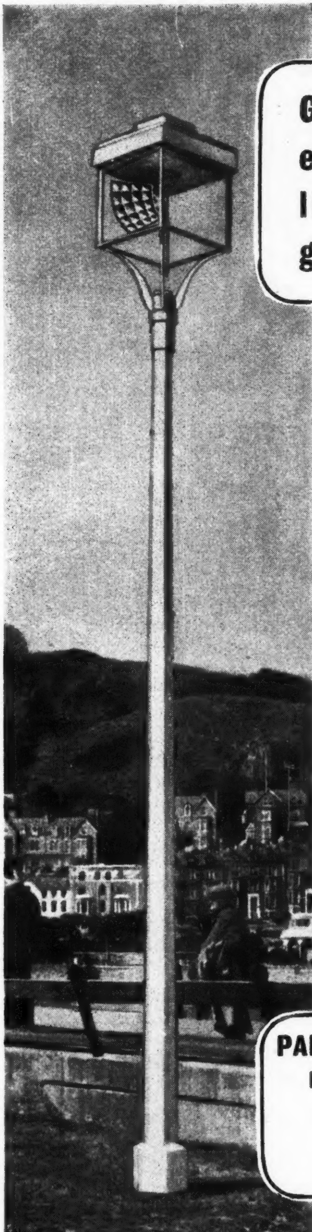


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Light and Lighting

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The official journal of the Illuminating Engineering Society.

Lighting and Shipbuilding

WE are a maritime people and have long been famous for the ships we build. There are, indeed, no better ships produced anywhere else in the world. Yet, generally speaking, the artificial lighting of shipyards—particularly of their outdoor areas—is of a rough and ready kind. Daylight is generally relied upon for shipbuilding berths, but this entails short working hours in the winter months, and the production of ships could be expedited if satisfactory artificial lighting is made available. It is by no means easy for this to be done, and particular interest attaches to a paper just given to the I.E.S. in London on the lighting of shipyards, because the author, Mr. J. S. McCulloch, describes how the difficulties involved have been dealt with in a large Tyneside shipyard. Very little information on the lighting of shipyards has been published previously, and Mr. McCulloch's comprehensive paper—when it appears in the I.E.S. Transactions—will be a welcome addition to the scant literature on the subject.

Notes and News

Ideal Home Exhibition

An ideal is surely a matter of personal taste and principle, thus any attempt to standardise it can rarely, if ever, be successful. However, at this year's Ideal Home Exhibition, held last month at Olympia, London, a broad attempt was made to cater for everyone's requirements in the home. The need for comfort combined with the convenient was well met and it is true to say that the odd touches of ingenuity and colour added to the general appeal of the exhibits. This applies mainly to the six fully furnished houses which formed part of the village—the centrepiece of the exhibition.

The most striking feature, perhaps, was the way in which colour was used. Colour was everywhere; the one-time monotonously favourite colour scheme of cream and green or rust has thankfully gone for ever and its place has been taken by bright and original combinations; white walls in a bedroom with a red over-all-patterned ceiling, splashes of orange to liven up a predominantly grey scheme. The idea, much in evidence at so many of last year's exhibitions, of making the fireplace or bed-head the main point of focal interest in a room by painting it in a contrasting colour or, even worse, surrounding it by a garishly coloured wallpaper, has happily disappeared. In fact, so have many of the other ideas which, being too extreme in their modernity, have never managed to appeal completely to the public. It can be said that furniture design is finding its feet at last. Designers are coming to realise that whilst they might well have a lot of fun designing weird and wonderful things, only weird and wonderful people like themselves could possibly be happy living amongst them.

As far as lighting is concerned, lighting engineers would have been glad to see evidence that the majority of designers at last realise its importance of place in home design. Lighting, on the whole, was well positioned, especially in bedrooms (dressing-table and overhead bed lighting), in bathrooms (mirror lighting) and in kitchens (interior cupboard and over-sink lighting). Central ceiling fittings have thankfully gone for good and the main lighting in many cases is from local lighting by standard lamps or, in the case of the dining-room or dining alcove, by adjustable pendant fittings. There are, of course, the usual exceptions. In one room, for example, a combined living- and dining-room, whilst ingenious methods for concealed lighting over a sideboard had been made, the other lighting was painfully inadequate, being from a small desk lamp in one corner, one standard lamp in the lounge and a central over-shaded pendant

Next I.E.S. Meeting in London

The next I.E.S. Sessional Meeting in London will take place at the Lighting Service Bureau, 2, Savoy-hill, W.C.2, at 6 p.m., on Tuesday, April 8.

At this meeting a paper entitled "Photo-luminescence as applied to lighting" will be presented by Mr. H. G. Jenkins and Mr. A. H. McKeag. The paper deals with theoretical aspects of luminescence and the general characteristics of phosphors and their applications to fluorescent lamps. Reference is made to various luminescent materials and to electroluminescence.

fitting low over the dining-room table. The total area being quite spacious, one felt that the effect was indeed rather gloomy.

As far as fittings were concerned, some were nice (conventional wall brackets of period design, pleated silk shades and others in substantial but attractive materials), some were nasty (using bamboo sticks, and bird-cage-type in wicker) and some amusing (shaped like a trombone for a little boy's room, or nautically fashioned in white rope). But, for the most part, they were at any rate "liveable-with" and acceptable by normal human standards—bearing in mind that these, in this country at any rate, are slow to change or be influenced by any radical changes in form or shape.

These remarks concern the lighting as exhibits in their own right. Where used on stands, a very high standard was achieved. Egg-crate louvres in false ceilings, gaily coloured adjustable spot-light fittings and architectural innovations in the use of light were employed most attractively throughout. It is perhaps at these exhibitions especially that one realises how effective and efficient the fluorescent lamp can be when used for display.

In all, as is the case every year, the exhibition was very well arranged and well worth visiting. However, it must be remembered that the Ideal Home Exhibition is essentially a trade show, designed to suggest rather than enforce any ideas on us and, within these limitations, it succeeds admirably.

I.E.S. Summer Meeting

By the time this issue appears the final notices for the I.E.S. Summer Meeting will have been distributed. The programme is essentially the same as that announced earlier, but we notice that there is no reference to the Ladies' Outing to Battle Abbey other than on the form on which to apply for tickets. This apparently is one of those mistakes which only show themselves after the final printing. We can assure the ladies that there will be this visit to Battle; coaches will leave Eastbourne at 2.30, tea will be taken at Battle and the whole party arrive back in Eastbourne soon after 5 p.m.

This is the first time that the meeting has been held in the London area and it is hoped that London members will give the meeting their full support.

We understand that the principal guest at the dinner on the Thursday evening will be the Astronomer Royal, Sir Harold Spencer Jones, and that Mr. John Christie, of Glyndebourne, will reply on behalf of the guests.

Whose Baby?

Many readers will no doubt have seen the article by John Betjeman which appeared in the *Daily Telegraph.* By kind permission of that newspaper, we reproduce the article in this issue as the subject is one of interest to all street lighting engineers. The technical reasons why columns have to be 25 ft. high and why concrete is used are irrelevant—though they were raised in the correspondence following the original publication of the article. It is quite obvious that thought is seldom given to the day-time appearance of a street lighting installation. But who, we wonder, should be responsible for considering the aesthetics of each installation—the street lighting engineer, the borough engineer, city or country architect, or Mrs. Smith who may otherwise have to see "sick serpents"—or worse—every time she opens her front door? We are quite certain they would beg to differ on what they want even though they may be unanimous in their opinions on some existing designs of street lighting columns.

In one of the letters in the *Daily Telegraph*, Mr. Christopher Hollis, M.P., drew attention to the comparatively meaningless phrase, "passed by the Royal Fine Art Commission," the use of which seems to have done more harm than good when applied to street lighting equipment. If this is the case, then the sooner something is done the better for all concerned, not least of all the Commission.

View of part of the interior of a London shoe shop, using a mirrored wall to give an illusion of spaciousness.

Concrete Lamp Standards in Old Town Settings

By JOHN BETJEMAN*

No one will deny the need for good street lighting. But there is growing concern about the ugly concrete lamp-standards which are being introduced into our old streets and country towns.

The Minister of Transport requires lights along trunk roads to be over a certain height and at a certain distance apart. What type of standard is used is left to the local authorities, but the Minister pays a percentage of the cost if the local authorities use a design which has been passed by the Royal Fine Art Commission.

The Council's surveyor will produce a sheaf of catalogues with which he has been supplied. On some of these the concrete firms supplying the designs put "Passed by the Royal Fine Art Commission."

It is not until the standards are up that bewildered citizens and possibly members of the street lighting committee itself realise that the Royal Fine Art Commission could not possibly have approved of these towering, sick serpents which have wholly altered the skyline and scale and look of the town. And they will be right, for the Royal Fine Art Commission does not approve of the placing of these concrete standards in old towns.

In August, 1950, Lord Crawford, the chairman of the Royal Fine Art Commission, stated the position of the Commission.

"The standards now being erected throughout the country have caused the Commission much concern. Of the many designs submitted for them few have met with approval. . . . The Commission has confined its activities to 'passing' those which avoided the worst faults. . . .

"But even if standards are well designed for trunk roads, they may look grotesque in different surroundings. The siting, material and size of new standards are as important as their design. . . . Far more consideration should be given to the matter, especially when it is essential to provide new installations in old settings."

The Commission could not have approved of the examples illustrated here, nor of other such schemes all over the country, of which Banbury, Abingdon, Devizes, Crewkerne, Wantage, Lincoln, Corsham, Carlisle and Wokingham are only some horrible examples known to me personally.

At the present moment Marlborough's famous High-street is threatened with a line of concrete standards down either side and another row down the middle. It is a pity that the Royal Fine Art Commission ever allowed itself to get into a position where its name could be used to encourage such brutalisation.

If you start to look at old iron lamp-posts in side streets, especially those which have not been altered by "swan-necks" in place of their original glass lanterns, you will see how gracefully they fit into any street. Their proportions date from late Georgian

Dignity and proportion: An old cast-iron lamp-post in Church-street, Theale.

* Architectural Correspondent to the "Daily Telegraph," from which this article is reprinted.

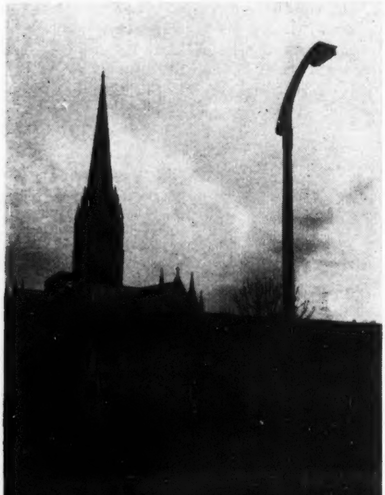
times. They vary from district to district, as does everything good and traditional in England.

Concrete standards never vary except in brutality. They lack proportion in themselves and to their surroundings. A very thick column generally of lumpy shape with a giant's match-strike at its base rears up to bend over and carry, one would expect, a very large corpse. Instead, all this effort goes into hanging a tiny bubble of a light or else a thing like a carpet sweeper.

Concrete will never weather; it will only streak and crack. It is too thick at its base for the narrow pavements of old towns, too unyielding in its texture beside the infinite and delicate varieties of building materials all over England, too coarse in its detail and outline beside the subtle mouldings and carvings which survive in almost every English town.

The chief argument in its favour is that it is cheap and easily obtainable. But we should not sacrifice the priceless heritage of our modest and easily damaged town architecture to such a penny wise, pound foolish policy.

There are alternatives. Where the houses are tall enough—and that is in most towns—Newbury's example can be followed. Here



A skyline ruined! Salisbury spire and one of its many concrete neighbours.

A "sick serpent" towering over a Georgian stone-tiled toll house.

simple iron brackets have been fixed to the upper stories of the houses.

In daytime they lose themselves in the hanging signs of the main street. At night they shed an ample white light. Bath has similar lighting. There is no compulsion to have that blue or orange light which drains the colour from old brick and the blood from our faces.

Where the surrounding houses are too low, iron standards, as at Swindon and Oxford, are preferable. And if the shortage of steel is so great now that not even for such beautiful places as, let us say, Ludlow, Louth, Oundle, Stratford-on-Avon, Cheltenham, Bristol, Newcastle, Wells, King's Lynn or Reepham is steel permissible then even wooden poles will do as a temporary measure.

Every lighting authority will be doing England a service if before embarking on a scheme it consults the local representative of a body like the Council for the Preservation of Rural England. This can be arranged by direct contact with the London headquarters of the C.P.R.E. And in big towns the local Arts or Architecture Society could give advice.

A town may be beautified by a well-thought-out lighting scheme. England's beauty is in its variety and it is ours to protect. Each place is a different problem.

Lighting in the Federal Assembly at Bonn

The lighting of the German Parliament House, described in the following article, has been specially designed to harmonise with the architectural features of the hall.

By A. KOLBE*

Light in the hands of an expert is a means of expression. It serves as a tool for the enhancement of the architectural style of a room in general and as an instrument for the creation of atmosphere. Its importance is far greater than that of a technical requirement only. In the case of the chamber of deputies of the House of Bonn it was stipulated that the lighting scheme was to blend in with the style of the room, which in this case is of the utmost simplicity.

In the last few years new light sources have been developed which lend themselves for ready adaptation to all architectural requirements, and so it was possible to design a lighting installation which formed an integral part of the architectural features of the chamber.

The chamber of deputies is housed in a new building which forms an annex to that of the Pedagogical Academy. It has a floor space of 1,000m.² and a height of 8.8m. The side walls are of glass and afford a view of the River Rhine. Press and public galleries extend some 7m. into the hall. Special attention has been given to the acoustics of the chamber. Means are provided to control the echo of the spoken word and to keep its volume at the correct level. To ensure this the ceiling has been fitted with square-shaped plywood casings (sound traps), following the pattern of a chessboard. These squares are alternately sunk into and protruding from the ceiling, and cover an area of 1.25m.² each.

In order to facilitate reading and writing at the deputies' desks without additional lighting from table lamps, an illumination density of at least 18 lm./ft.² was required. In addition, the lighting had to be as shadow-free as possible, and specular reflection at the desk tops had to be avoided.

The pronounced pattern of the ceiling suggested the application of the light sources in a manner which accentuated the chessboard-like character. This scheme could, of course, only be realised if high-tension fluorescent lamps were used, as they can be readily adapted to all architectural shapes and forms. Lamps of this type have a very low brightness, i.e., less than 0.3 stb. This represents an additional advantage, as it obviates the need for the provision of special glare-suppressing attachments. In this particular case the sound traps protruding from the ceiling and numbering 218

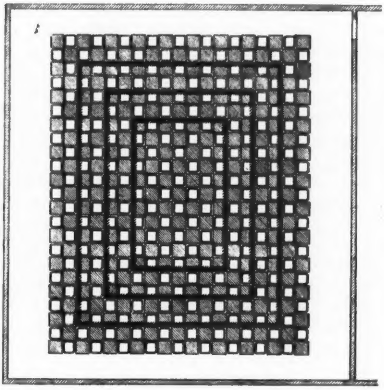


Fig. 1. Showing arrangement of lamps in four groups, each of which can be controlled individually.

* Siemens-Schukert Werke, Erlangen.

Fig. 2. Lighting in the Chamber of Deputies by high-tension fluorescent lamps.

in all could accommodate all the tubes required for the installation, a fact which eased assembly difficulties appreciably.

The table below gives a summary of the data which form the basis for the assessment of the performance of the installation. The utilisation factor (n) was fixed at 0.27, corresponding to a height of 8.8m. and taking into account the nature of the finish of the ceiling (a dull ivory), and the wall adjacent to the platform, which is also painted in light colours. The reflection properties of the bronze-coloured curtains made from artificial silk and covering exceptionally high windows, had also to be considered. The lamps are operated at a current of 75mA and give a luminous flux of 750 lm. As an illumination of 18 lm./ft.^{2} over an area of 1,000m.^{2} was required, the total length of the tubing could be calculated as follows:—

Total fluorescent lamp length equals =

$$\frac{\text{Floor area (m.}^2\text{). Luminous intensity (1x)}}{\text{Luminous flux (1m.). Efficiency}}$$

= 890m.

Due to the particular dimension of the boxes fixed to the ceiling no more than 872m. of tubing could be installed, i.e., 4m. for each square.

Each lamp has a length of 2 m. The colour of the light emitted closely resembles that from tungsten lamps. Every other compartment of the square-shaped sound traps is enclosed by a combination of two right-angle tubes, one fixed parallel to the axis of the room and one fixed across the axis of the room. The ends of the lamps are so close to each other that the air gap

Comparison of Cold Cathode and Tungsten Lamps

	Cold cathode fluorescent lamps. 75 mA	Tungsten lamps
Floor area (m^2)	1000	1000
Illumination (lm/ft^2) ...	18	20
Efficiency (n)	0.27	0.27
Flux (lm) per unit	750	3450
Total flux (lm) per unit ...	665,000	750,000
Tubing (m)	890	—
Tungsten lamps	—	218
Consumption (W) per unit ...	25	200
Total consumption (kW) ...	22.0	43.6

Fig. 3. View of the lobby in front of the Chamber.

between them is not noticeable. The whole of the wiring and auxiliary apparatus are placed in the attic. The electrodes of the tubes are covered up by the plywood panels of the sound traps, and connections with the wiring system are made by means of clips. Each tube is suspended from the ceiling and supported by four white, padded clips. The padding is provided in order to suppress any vibrations. This arrangement facilitates replacement.

Each circuit feeds a total length of 12 m. of tubing, i.e., three squares. Each circuit is connected to the supply across a transformer of the self-regulating type of 6 kV capacity operating in the range of 75 to 90 mA.

A total of 74 transformers was required; all were placed in the attic of the chamber, and each was positioned as near as possible to the lamp circuit it served. Each transformer is housed individually in a container fabricated from zinc-coated sheet metal to comply with the existing regulations. Soundproof padding is provided.

The lighting underneath the gallery also consists of high-tension lamps. Seventeen lines of lamps, each six metres long, are mounted on the ceiling formed by the gallery. The electrodes are placed in casings made from plastic topped by brass.

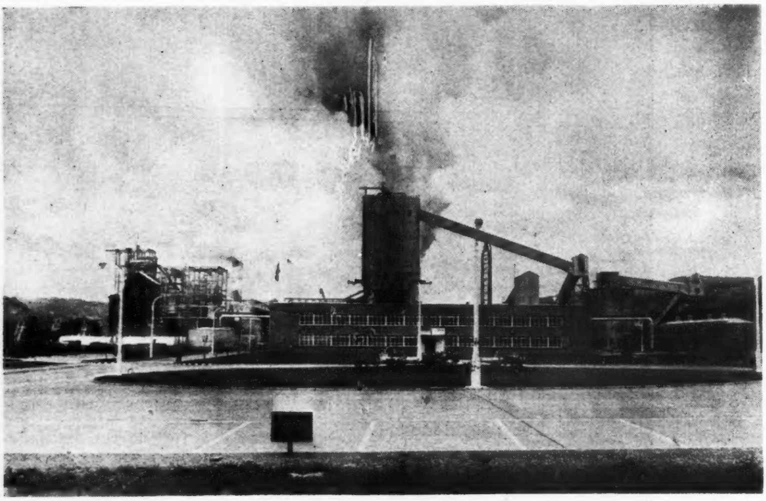
In order to keep the lighting intensity in the chamber flexible, all 218 squares were divided into four groups, which can be controlled individually. (Fig. 1.) A fifth group is planned to control the lighting underneath the gallery. The lighting intensity of each group can be adjusted by means of A.C. controller to change smoothly from minimum to maximum and vice versa, without any alteration in the spectral composition of the light. Such regulation could result in the flickering of the lamps if the voltage of the supply is reduced to about 40 per cent. of the total, but in practice so low a voltage is not employed. Ordinarily the lighting is switched off altogether before this value is reached.

A total of 13 motor-driven A.C. controllers with an overall load of 65 kVA is provided for use in the five groups of lamps mentioned. These controllers, too, are installed in the attic of the chamber. The controls are operated by push-buttons via relays. One panel of buttons is fixed in the projector room and one near the entrance of the chamber.

After completion of the installation, the transformers were set to operate at 75 mA, the illumination was measured and found to be 22.5 lm./ft.^{2}. As the transformers can be set to operate at 90 mA a considerable reserve is kept in hand; in other words, it has been found that the actual efficiency of the installation is better than originally expected, i.e., 0.34.

Means can be applied to correct power

(Continued on p. 131)



Lighting at Nantgarw Coking Plant

By E. N. LOCKYER,*
A.M.I.E.E., F.I.E.S.

The lighting of industrial plants such as that described in this article has always presented problems to the lighting engineer, and in the past too many have been inadequately lighted. It will be apparent from the following that careful attention has been given to the lighting of the new plant at Nantgarw.

The new Coke Oven and By-Product Plant at Nantgarw, lying in the Taff Vale between Cardiff and Pontypridd, is reputed to be among the finest in the world. It produces first-grade coke for blast furnaces and for domestic use while the gas liberated is distributed through the East Glamorgan grid of the Gas Board. Other valuable by-products are also recovered. A short description of the process may assist the reader to appreciate the lighting problems involved.

Various grades of coal from the collieries are blended and, after crushing, are conveyed to the large 3,000-ton capacity service bunker for feeding to the ovens. The coal is carbonised in the ovens to produce coke, while the gas is drawn off for treatment in the by-product plant to recover tar, ammonia and benzol. The coke is discharged from the ovens by a ram pushing machine, quenched and conveyed to be screened into sizes before being loaded into rail wagons or lorries. The ovens are heated by part of the gas liberated, or by producer-gas generated on site.

Coke oven works are exempt from compliance with certain parts of the Factories (Standards of Lighting) Regulations, 1941; but nevertheless, wherever possible, the Regulations have been fully implemented. In certain buildings, notably the gas producer exhauster house, where flame-proof lighting is demanded, the intensity of illumination is in excess of 10 lm./ft.^{2}.

Economic factors were fully considered

* Registered Lighting Engineer (I.E.S.).

when deciding the type of lighting for the various sections of the plant; discharge lighting, in places, would have shown some advantage, but generally a tungsten scheme has been adopted. One of the points in favour of tungsten lighting is that, after a power failure, the lights are immediately available when the power is restored, and the increased safety of this feature was considered to be important.

In deciding the type of lighting fittings to be employed it had to be borne in mind that many sections of the plant, such as conveyors, operate with little attention. Despite this, it was felt that a good standard of lighting was desirable and that the fittings used should be those most suited to each location.

It is not intended in this article to describe the lighting, building by building, but to give typical examples of the use of the fittings chosen.

First, the ordinary plain well-glass lantern, almost universally used in the older plants, is relegated to the exterior lighting of doorways where it serves as a useful approach beacon.

Fig. 1. A typical belt conveyor gantry with Revo prismatic bulkhead fittings.

Fig. 2. Benjamin deep-dome well-glass reflectors used on the stairway on the outside of the ovens' service.

It will have been gathered that conveyors are extensively used in this plant and, external to the buildings, these are carried in enclosed gantries with walk ways on one or both sides of the belt. The Revo Electric Co., Ltd., have supplied 100-watt bulkhead fittings, and these are attached to the cross members of the gantry structures at spacings of about 15 ft. For conveyors having one walk way the fittings are offset from the centre, but where a double gangway exists, central suspension is adopted. Even in the latter case an intensity of at least 0.5 $lm./ft.^2$ is provided. Fig. 1 shows a typical conveyor of this type and it will be noted that, though the third light is out, the lighting is still adequate. Continuous lighting of conveyors is not generally necessary during the hours of darkness, and, to encourage economy, control of the lighting can be made at either end by means of two-way switching.

Outside stairways are all lit for safety requirements and, to avoid excessive glare, controlled lighting is provided by the use of Benjamin deep-dome porcelain well-glass reflector units. One of the most important stairways in the plant is that extending from

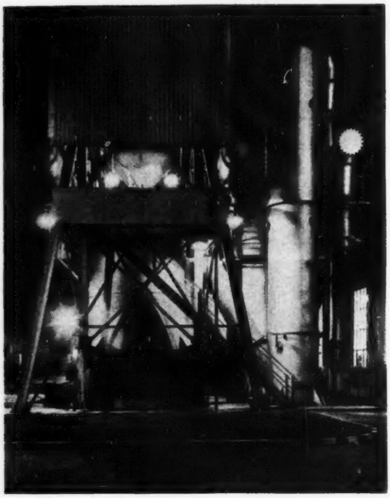


Fig. 3. Outside view of the producer-gas generators where Benjamin standard dispersive reflectors are used.

likely to be a source of trouble. Fig. 3 shows part of the producer-gas plant. On the control platform eight 200-watt fittings around the two-coke feed hoppers give an intensity in excess of 10 lm./ft.^{2}. Bracket-mounted 300-watt fittings give a good working light around the ash pans at the base of the plant.

Beneath the coke bunkers is the platform housing the re-screening conveyor and the "Belle-Isle" bagging and weighing machines, and from here lorries may be loaded either with bagged or loose coke. Under adverse conditions a fair amount of dust can be present and the 200-watt fittings over the platform are equipped with visors. Fig. 4 shows an outside view, where it will also be seen that ample light is provided over each lorry loading station by means of similar 300-watt fittings.

In a number of rough working areas, where better lighting conditions can be

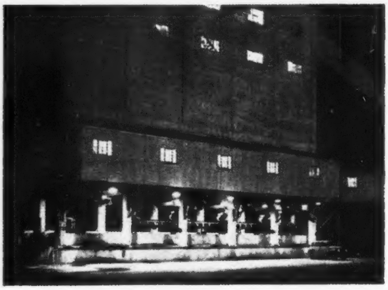


Fig. 4. Lighting of the coke bunker bagging platform and lorry-loading station by Benjamin reflectors with visor protection.

the level of the top of the ovens to the top of the reinforced concrete service bunker which reaches to a height of nearly 180 ft. The stairway (Fig. 2) is carried between vertical ribs on the side of the bunker and, as the flights are separated from the bunker wall, a high standard of lighting is required to give confidence to the user. The 200-watt fittings are bracket-mounted from the bases of the handrail supports, and the arrangement is such that each light is directly above the centre of a flight and its lower landing. There is a complete absence of glare while the reflection from the building helps to minimise the effect of the user's shadow. Even if one lamp fails the resultant effect is still satisfactory. Here, again, two-way switching is provided.

For ordinary working areas the Benjamin "Saaflux" type of standard dispersive is used with the addition of heavy duty tops and glass visors where dust and dirt are

obtained by increasing the background brightness of walls and ceilings, use is made of the Holophane enclosed reflector bowl pendant. An interesting example of such a situation is the area beneath the coal blending bunkers. The 10 bunkers, each hexagonal in section, are arranged in two interlocking rows of five. In the basement the bases of the bunkers taper to form feed points for the variable speed conveyors delivering coal for blending on to the central conveyor. The lighting problem is further complicated by the presence of massive supporting columns for the bunkers above, but Fig. 5 indicates the good effect from the central row of 300-watt pendants supplemented by the distribution from similar fittings, one between each bunker of the two rows. These latter fittings are offset somewhat towards the outer walls of the building to even up the illumination and to provide spill-light around the backs of the feed

conveyors. An intensity of 6 lm./ft.^{2} is maintained in the working areas of this basement.

A similar pleasant effect is obtained in cleaner situations by means of the Benjamin industrial diffusing unit. A typical example is the central pump house (Fig. 6) where good, diffused lighting is obtained without disturbing reflections from the tiled walls and control panels. An intensity of 6 lm./ft.^{2} is provided.

The largest flameproof lighting pendant at present available is the 300-watt size, and, to achieve a good standard of illumination in lofty buildings where this type of lighting is required, a relatively large number of units is necessary. The gas-exhauster and compressor building is 115 ft. long by 38 ft. wide, and the flat roof which is about 38 ft. above floor level, is supported by reinforced concrete beams spaced at 15 ft. intervals. Suspension of the 300-watt Holophane flameproof prismatic units is from straps embracing these beams (Fig. 7). Over the main area each beam carries four fittings. Alternate rows of three and two are arranged over an elevated platform where the gas exhausters are situated. A total of 25 fittings maintain an intensity of 6 lm./ft.^{2} at both levels.

Flameproof lighting is also required beneath the ovens where a working space has to be provided under the fuel-gas-distributing pipes. Sufficient and suitable

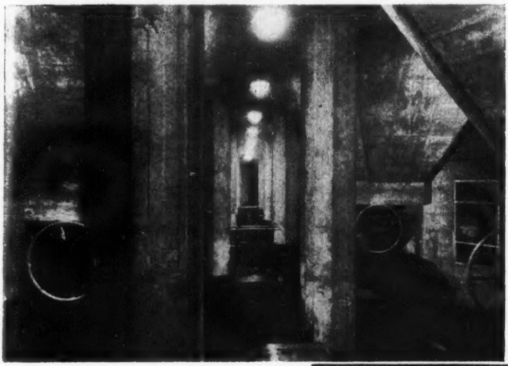


Fig. 5. Holophane enclosed prismatic pendants over the coal-blending conveyor.

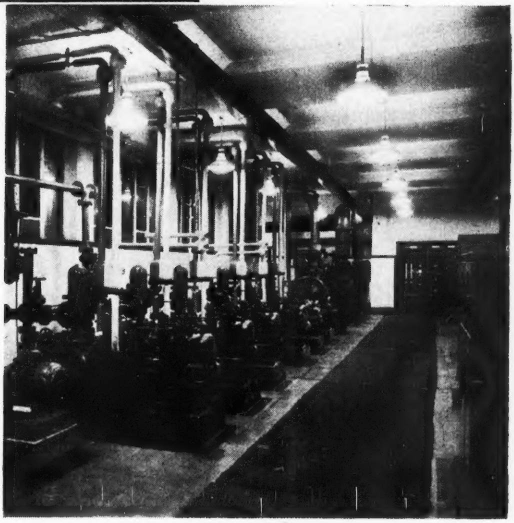


Fig. 6. Benjamin reflectors in the central pump room.

Fig. 7. Holophane prismatic flameproof lighting pendants in the gas-exhauster and compressor house.

lighting must be given to enable adjustments to be made to the flame jets, and for the inspection of the many valves and their operating gear. Most of the light is required in the upper parts of the basement and, since there are as yet no flameproof diffusing pendants giving an all-round distribution, glare can be a major problem. The arrangement of the pipework precludes the use of horizontally inclined prismatic angle fittings arranged at archway level, and a compromise is obtained by using a comparatively large number of low voltage flameproof well-glass fittings, without reflectors, and close ceiling mounted between the rows of pipes. (Fig. 8). In all about 150 60-watt lanterns supplied by the General Electric Co. Ltd., are used and the illustration shows that an even illumination is obtained. The overall effect is satisfactory though the intensity at ground level is of the order of 1 lm./ft.^{2}. The provision of several circuits enables a considerable economy to be affected during non-working periods.

Around the plant fluorescent batten fittings are used in small offices and control points. These fittings were supplied by Crompton Parkinson, Ltd., Elcordia, Ltd., and Thorn Electrical Industries, Ltd. The latter company also supplied a number of twin-tube open-top trough reflectors for use in the service bunker sub-station and the adjoining electricians' workshop where natural lighting could not be provided.

The administrative building is designed to house the staff of the Carbonisation Department stationed at the plant, and also to provide a colliery group office. An almost completely fluorescent system is installed

Fig. 8. Lighting of the fuel-gas distributing pipework in the ovens basement by means of G.E.C. flameproof well-glass lanterns without reflectors.

and, with the exception of Heffer louvred ceiling units above the table in the board room, all offices and corridors have G.E.C. "seagull" fittings. Fig. 9 illustrates a private office, and the photograph shows how the light-coloured blinds assist to diffuse the light on the desk. The general intensity in all offices is of the order of 20 lm./ft.^{2}. G.E.C. open-top trough reflectors are used over the benches in the laboratory annexe (Fig. 10), pilot lighting being provided for the office cleaners by means of four small "seagull" fittings. Messrs. Booth and Bomford, Ltd., Cardiff, were the wiring contractors for this building.

With the exception of the offices and the flameproof areas all buildings and conveyor gantries have provision for the use of 25-volt lighting units for portable handlamps. The 120-watt transformer units, fed from the lighting system, were supplied by the Concordia Transformer Co., Ltd. Similar units are used on the machine tools in the workshops, but the primary supplies are taken from the motor terminals at 500 volts.

Certain sections of the by-products plant are in the open, and are supported by steel structures. This calls for the floodlighting of galleries and platforms, where adequate lighting is required for the safe movement of the operating staff, and for the operation of the various valves and controls. For short throws, Benjamin parabolic angle fittings are used, but, in general, greater use is made of 500-watt Benjamin "Duoflux" or Simplex "Reflecto-floods" supported from the structures or from adjacent buildings. Fig. 11 gives a good

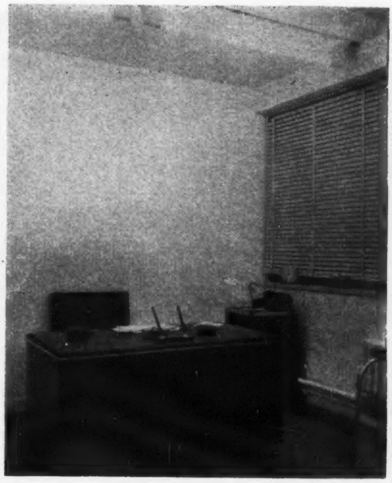


Fig. 9. G.E.C. fluorescent lighting in a private office of the administrative building.

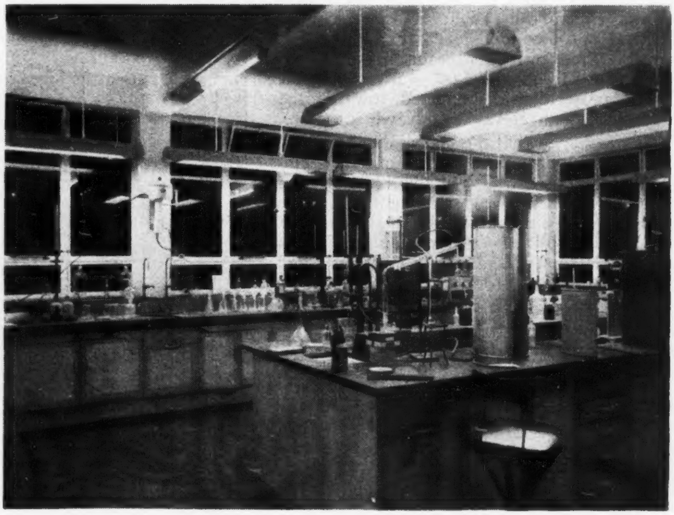


Fig. 10. G.E.C. open top fluorescent trough reflectors in the laboratory.

Fig. 11. Open - flood lighting of the benzol plant.

idea of the effect of such lighting at the benzole plant.

Projectors using general service lamps are used to floodlight the areas around the ovens. On the side of the ovens, where the pushing machine operates (Fig. 12), the lighting is provided by 500-1,000-watt Wardle dual focus projectors mounted on the three gas main gantries crossing the road to the by-products plant. The illustration also shows two of the eight 500-watt Wardle general purpose floods used for lighting the top of the ovens. On the discharge side of the ovens Holophane 1,000-watt rectangular beam projectors are directed towards the ovens from an elevated conveyor structure.

It was hoped that the main sidings lighting would have been installed before the completion of this article, but this has not been possible. Very briefly the lighting of the sidings will, in general, be by means of special 1,000-watt Holophane projectors arranged for general service lamps and mounted in pairs at the top of 50-ft. tubular steel masts. Safety pilot lighting will be provided by 500-watt prismatic bowl street lanterns mounted at 25 ft. on the same columns.

The street lighting throughout the plant comes well within the limits demanded by the Ministry of Transport for Class A road lighting. There is, however, one departure from recommended practice. A column height of 22 ft. is made necessary at the ovens where the ram of the pushing machine crosses the road, and this is adopted and standardised throughout. The columns are Concrete Utility's avenue 3DN with 3 ft. 3 in. arc brackets supporting B.T.H. side entry mercury vapour lanterns fitted with prismatic bowls giving a non-axial asymmetrical distribution. Control is by means of Horstmann electrically wound time switches with solar compensating dials. Fig. 13 shows the main

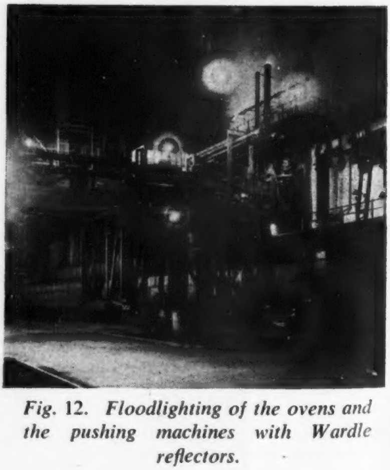


Fig. 12. Floodlighting of the ovens and the pushing machines with Wardle reflectors.

Fig. 13. View of the B.T.H. lighting installation along the main roadway near the administrative building.

roadways near the administrative building. Street lighting equipment was supplied by the British Thomson-Houston Co., Ltd.

The lighting system is 240 volts, three-phase, three-wire, conforming to colliery practice, and supplies are taken from each of three main sub-stations via 100-kVA transformers supplied by the South Wales Switchgear Co., Ltd. The administration building has its own 100-kVA transformer. Lighting switchboards are of the re-wireable switch fuse type specially designed to the author's specification by the General Electric Co., Ltd. All sub-main and circuit wiring, with small exceptions, is carried out with Pyrotenax mineral-insulated copper covered cable.

The author is a member of the Divisional Engineers' Department of the South-Western Division of the National Coal Board, and was responsible for the lighting scheme; the installation was carried out by the electrical staff of the Divisional Carbonisation Department. Acknowledgments are made to the Divisional Scientific Department for the photographs used to illustrate the article, and to the National Coal Board for permission to publish it.

Lighting in the Federal Assembly at Bonn

(Continued from p. 123)

factor of the fluorescent lamps, and a saving of some 20 kw. can be achieved with respect to a tungsten-lamp installation, providing the same illumination (see table). Thus it is proved that high-tension lamp installations do not only offer advantage over other forms with regard to the quality of lighting but also with regard to its economy, bearing in mind that the lamps have a minimum service life of 6,000 hours.

On the day the Federal Assembly was opened and the lighting plant was put into operation for the first time, comments were made on the fact that the lighting of the chamber complied in a most excellent manner with all the stipulations laid down for it, and in addition produced a beautiful architectural effect and a soft and glarefree light (Fig. 2).

The lobbies in front of the actual chamber are also lit by cold-cathode lamps. Here individual chandeliers have been used (Fig. 3) with built-in transformers. Each fitting carries six lamps 2 m. in length. The transformers can operate at any current value in the range of 50 to 85 mA and are practically noiseless in operation. The average illumination of the lobbies is 1.2 lm./ft.^{2}. Two of the fittings carry emergency lamps of 200 watt, which will illuminate the area satisfactorily in the event of a failure of the main supply.

A Spectral Band Photometer for Fluorescent Lamps

By W. HARRISON,* B.Sc.

In view of the growing importance of colour measurements on tubular fluorescent lamps, it is felt that a description of an instrument which is in use for routine measurements of the percentage luminance in the eight spectral bands and the chromaticity co-ordinates may be of interest. The instrument is of simple design but is the result of several years' experimentation, particularly in the mechanism for accurately and rapidly selecting the specified spectral bands.

The instrument employs a selenium photocell as receiver; its convenient shape and dimensions enable the whole spectrum to be focused on to the cell, and the various sections of the spectrum can be selected as required by suitable mechanical masks being brought into position in front of the cell.

The selenium photocell output is measured directly on a suitable galvanometer, but in order to obtain adequate sensitivity the optical components have to be large. This and the means for selecting the spectral bands are the chief design features of the instrument which is shown in Fig. 1.

The Optical System

The optical system comprises a 3-in. diameter 7-in. focus collimator lens, a 3-in. x 2-in. dense flint glass prism and a 2½-in. diameter 12-in focus lens for focusing the spectrum. The collimator lens is a Kodak Ektar Aero lens and the 12-in. focus lens is an achromatic telescope objective.

The entrance slit is a fixed slit mounted by means of a brass plate on to the front of the instrument. The slit is 25 mm. deep and ¼ mm. wide and is curved in order to give substantially straight spectrum lines. The spectrum is approximately 43 mm. deep and 37 mm. wide.

Spectral Band Selector

The device for selecting the wavebands consists of a rotatable brass disc with a series of slits as shown in Fig. 2. The positions of the slits were determined by drawing a series of concentric circles, the first of a convenient radius corresponds to 4,000 Å in the spectrum and succeeding circles correspond to the wavelength intervals 4,200, 4,400, 4,600, 5,100, 5,600, 6,100, 6,600, 7,600 Å. The values of the radii are obtained from the dispersion curve of the instrument as determined by measurement of the positions of mercury and cadmium lines in the mercury/cadmium lamp spectrum. The slits are cut tangential to the circles at appropriate positions around the disc.

Slit Shapes for XYZ

In the case of the curved slits or masks for XYZ measurement the heights of the ordinates at the wavelength intervals have been determined as follows: The distribution coefficient in the published data, e.g., $\bar{x}$ at 4,400 Å, was divided by the photocell relative spectral sensitivity at that wavelength. Thus a series of values at the wavelength intervals was obtained. The photocell spectral sensitivity values were taken from the average value for EEL photocells as determined by the N.P.L. and published in the Journal of Scientific Instruments, May, 1950. This procedure was adopted because (1) variations from cell to cell are not unduly large especially if the cells are preselected; (2) having set up the instrument a number of photocells can readily be tried in order to select one which best matches the mask. In other words it has been considered more convenient to find a photocell to fit the mask characteristic rather than vice versa.

A further factor had to be taken into account. The dense flint glass prism is yellowish in colour and absorbs some of the blue end of the spectrum, the trans-

* Research Laboratories, Siemens Electric Lamps and Supplies, Ltd.

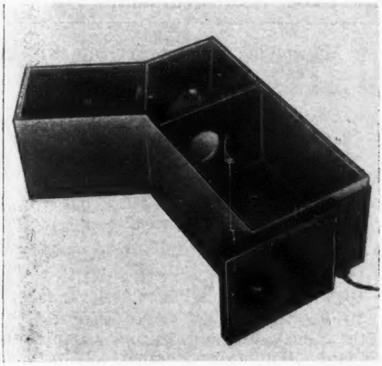


Fig. 1. Galvanometer for measuring the selenium photocell output.

mission at 4,200 Å being approximately one-half of that of 5,600 Å, so the ordinate values as obtained above had to be divided by the transmission values at the various wavelengths.

In marking off the curved slits the ordinates were, of course, on the tangents to the circles and not on the circles themselves.

The disc is mounted on a spindle and rotates between brass plates. A locating spring enables the slits to be selected as required and in order that they should locate precisely care was taken that the disc was mounted centrally and rotated smoothly and without play.

The Photocell and Galvanometer

The photocell is an EEL 50 mm. x 37 mm. The galvanometer in a Tinsley Type SS6 of resistance 450 ohms and sensitivity 1,670 mms/μAand it has been fitted with a shunt giving an additional 1/10th sensitivity range.

A reversing switch between the photocell and the galvanometer enables the current to be reversed so that in taking a reading the sum of the deflections in both directions is taken and there is no need to locate the spot exactly on zero.

Measurements and Calibration

In order to measure the spectral distribution of a fluorescent lamp the lamp is placed directly in front of the entrance slit about one inch from it. This method is quite satisfactory as light from an area about 25 mm. x 5 mm. on the lamp is entering the slit. The uniformity of colour along a fluorescent lamp is such that this area is sufficient as a representative sample; measurements on several parts of the lamp invariably confirm this.

The results of the measurements are expressed in the form of percentage of the total light flux in each waveband and thus different weighting factors have to be applied to the galvanometer readings for each waveband. These factors are obtained from readings on a calibrated illuminant which is either a calibrated fluorescent lamp or the standard Illuminant A or C.

The use of a calibrated fluorescent lamp has the advantages of a substitutional measurement where two similar spectral distributions are compared and in the routine measurements on fluorescent lamps a cali-

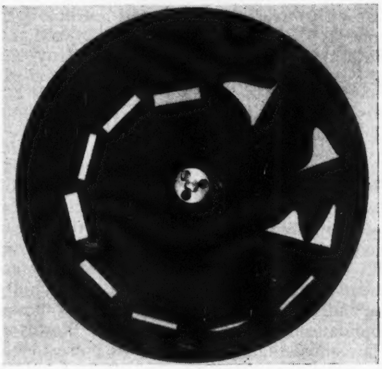


Fig. 2. Device for selecting wavebands.

brated fluorescent lamp of similar type is measured with each batch of lamps to obtain the factors to be used.

The table gives the results of measurements made on a lamp.

A refinement which is not essential where lamps of similar type are compared is to shape the slits according to the relative luminosity curve through the band. Band No. 7 has been so corrected as may be seen in Fig. 2.

The measurements of chromaticity coordinates on this instrument have been used to supplement those made on a visual colorimeter. In setting up the instrument care was taken that the spectrum was correctly located with respect to the masks as shown by measurement of the length of mercury/cadmium lines coming through the masks.

In the measurement of a fluorescent lamp

Measurements obtained on a Natural colour fluorescent lamp

Spectral Band	Galvanometer Reading Microamps	Multiplying Factor	Percentage Luminance
4000–4200	0.033	0.46	0.016
4200–4400	0.102	3.75	0.40
4400–4600	0.056	6	0.355
4600–5100	0.195	27	5.46
5100–5600	0.377	94	37.2
5600–6100	0.450	100	47.0
6100–6600	0.094	93	9.15
6600–7600	0.013	18	0.25

a substitutional method is again employed, the factors being obtained by measurement of a calibrated fluorescent lamp on each occasion. However, the lamp need not be of the same type, for measurements of Daylight, Natural, Warm White and Mellow any one of these may be used as the comparison standard. For more saturated colours such as the coloured lamps, a lamp of appropriate colour is used.

The instrument will be exhibited at the Physical Society Exhibition in April.

Colour Group

At a recent meeting of the Colour Group, Dr. G. W. Granger, of the Institute of Psychiatry, Maudsley Hospital, lectured on colour preference. He explained that there were two opposite schools of thought on this matter. One held that colour preferences were purely individual and wholly dependent on personal taste with no common foundation. The other school, however, maintained that the matter was more objective, and that there was an order of colour preference which would find more or less general acceptance.

Dr. Granger described an extensive series of tests which he had made on a group of 50 people with normal colour vision—25 men and 25 women—with the object of deciding between the two hypotheses. First, he explained the way in which it was possible, on accepted statistical grounds, to arrive at the average ranking of samples from the results of a number of rankings by individuals, and then he went on to describe the conditions of the experiment. The colours used were chips from the Munsell colour atlas, and these were viewed against a neutral grey background under two lights approximating to standard illuminants A and C on the C.I.E. colorimetric system. No noticeable difference was found for the two illuminants.

In the first series of tests the subjects were given six chips and asked to place them in order of preference. The extent of the agreement between the observers was statistically significant and showed a general preference for colours at the blue end of the spectrum, those at the red end being placed lowest. The next series of tests was on colour contrast, two pairs of colours being presented at a time and the subjects being asked to express a preference for one of the pairs. Here it was found that with the more saturated colours the preference was generally for the greater differences of hue, but lower degrees of saturation were preferred to more saturated contrasting colours.

Experiments were also made on the so-called "area balance" of colours. It has been laid down for a long time by artists that a large area of a less saturated colour can be balanced by a much smaller area of high saturation, and this was borne out by the tests made. The lecturer said he had attempted to test the rules proposed by Munsell and by Moon and Spencer on this matter and had come to the conclusion that whereas the Munsell formula had considerable predictive value, this was not true of Moon and Spencer's rules, for these, when applied to a series of simple colour designs, did not give results in accordance with the preferences expressed by the observers.

Summing up, Dr. Granger said that he felt that the tests tended, on the whole, to support those who felt that colour preference had an objective basis and was not entirely a personal matter. In all cases the amount of agreement between rankings was sufficient to justify the objective hypothesis.

Lighting of New Wards at Guy's Hospital

Recent articles have dealt with research into means of providing the best lighting in hospital wards. The following article describes what has been done to provide better lighting in one of the oldest London hospitals.

By FRANK LAW
M.D., F.R.C.S.

An opportunity has lately arisen to install what is for Guy's Hospital an entirely new system of ward lighting. This was provided by the necessity for practically rebuilding the wards in question, and was particularly suitable in that architectural conditions demand the artificial lighting of the wards for the greater part of the day.

Each ward is 48 ft. long by 20 ft. wide, and 15 ft. high, and contains eleven beds in the conventional positions. The finish chosen for the walls was satin, pale peach in colour, with white ceilings. The main illumination comes from eight fittings housing four 2-ft. 40-watt fluorescent lamps; two double-glow starters reduce dimensions and weight. (Fig. 1.) The aluminium reflector is sprayed white on the inside and bronze on the outside, and carries a shallow 030 opal "Perspex" panel below, which ensures a combination of reflected and diffuse direct illumination. The fittings hang at a height of 10 ft., i.e., 5 ft. from the ceiling. (Fig. 2.)

For emergency use alternative tungsten fittings are also provided on a different circuit. Lighting of the wards at night is provided by low-level low-power lights which illuminate the floor and give sufficient reflected light to ensure safe and easy movement about the ward.

The most important problem of individual bed-head lighting has been solved by lights containing 60-watt tungsten lamps set in suitable conical reflector screens; these give ample light for reading and for examination of the patient, and do not disturb the patient on the opposite side of the ward. (Fig. 3.)

At first the installation was rightly objected to on the ground that a degree of lividity was given to the patients' complexions; some of the "Daylight" lamps were then changed for "Warm White," which corrected this fault. The general effect of this lighting is most pleasing, warm and unobtrusive; many unsolicited compliments have been paid. Though most people take illumination—good or bad—for granted, specific enquiry from the patients elicited approval.

Lighting Tests

These were carried out by a photo-electric auto-photometer after the lamps had been running for 800 hours; voltmeter readings showed that the equipment was operating at its correct voltage of 230. These results are shown in Fig. 4; the necessity for bed-head lights is clearly demonstrated. The bed-head lighting tests (Fig. 5), taken with a 25-watt lamp in the fitting, showed at once that a higher-wattage lamp was needed; the letters H, B, and M indicate respectively the position of the patient's head, book, and a point midway down the bed.

The fitting is obviously a dust collector.

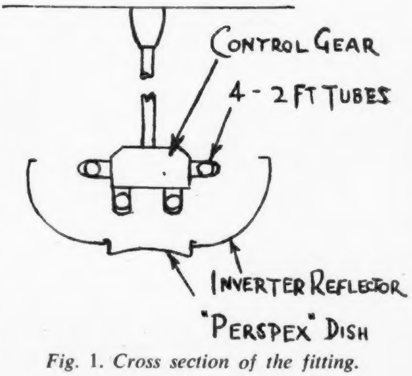


Fig. 1. Cross section of the fitting.

Fig. 2. General view of the ward.

but at least the dust remains where it has collected, and cleaning is achieved by the easy removal of the "Perspex" dish. Lamp replacement is simple; lamp life is 5,000 operating hours, compared with 1,000 hours for filament lamps.

Installation of these fittings is more costly than that of incandescent lamps, but operating costs are far less. Any comparison must take into account the fact that the lighting is largely indirect—not the cheapest form of lighting. For an equivalent illumination twice the number of incandescent fittings would be required, which would add considerably to installation costs. Table 1 shows the comparative costs, while Table 2 shows at what number of operating hours the cost becomes equal for the two systems; it is seen that the balance is reached at 175 hours per annum, any consumption above this very low figure operating to the economic advantage of the fluorescent system.

The fittings were supplied and the tests carried out by Thorn Electrical Industries, Ltd., to whom acknowledgment is made for supplying technical details. The contractors were Messrs. Hoare, Lee and Partners.

Acknowledgment

Acknowledgment is made for permission to reproduce the illustrations which originally appeared in Trans. Oph. Soc., Vol. 71. 1951.

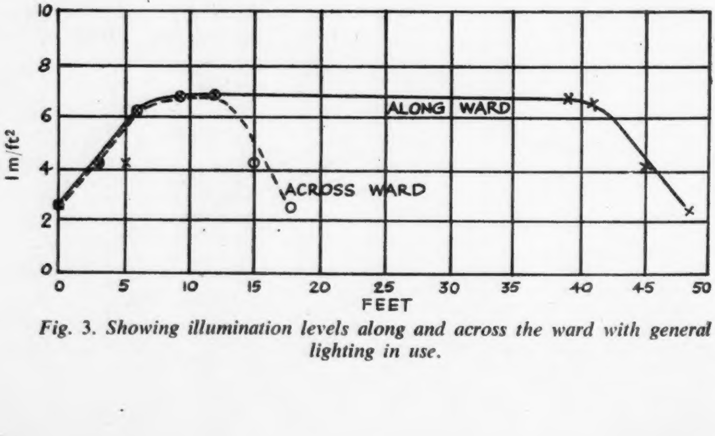


Fig. 3. Showing illumination levels along and across the ward with general lighting in use.

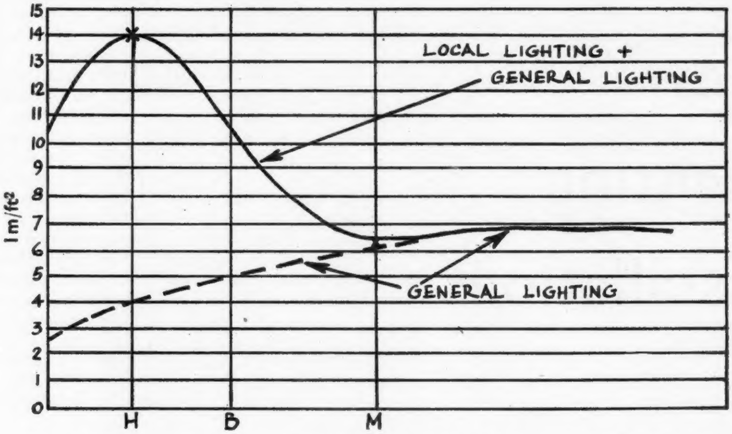


Fig. 4. Showing illumination provided by bed head lighting units. H, B and M refer to position of patient's head, book and middle of the bed respectively.

TABLE I

Economic Cost Comparison

OUTLAY	Fluorescent fitting as used	Equivalent fitting in incandescent
Price of fittings (including advances and Purchase Tax)	£12 11 8	£5 0 0
Light output in lumens	5360	62700
Number of fittings for equivalent result	1	2
Cost of fitting	£12 11 8	£10 0 0
Lamp replacements	£2 19 0 per 5,000 hours	6s. 8d. per 1,000 hours
Hours use per annum	6,000 hours	6,000 hours
Electrical Load	200 watts	400 watts
RUNNING COSTS Cost of electrical energy p.a. @ 2d. per unit	£10 0 0	£20 0 0
Cost of lamp replacements p.a.	£3 10 0	£2 0 0
Total operating cost	£13 10 0	£22 0 0
Saving per annum	£8 10 0 per fitting	

TABLE II

ECONOMIC OPERATION	Fluorescent fitting as used	Equivalent fitting in incandescent
Assume that the fittings last for 10 years, then annual cost of fittings	£1 5 2	£1 0 0
Electrical costs for 175 hours p.a.	5 10	11 8
Lamp replacement cost	2 1	1 5
	£1 13 1	£1 13 1

L.S.B. Design Courses in London and the Midlands

The next L.S.B. Illumination Design Course in London will be held from April 21-24. As well as 11 lectures on the basic principles of lighting and lamps there will be a number of lectures on individual subjects such as shops, schools, offices, homes, hospitals and public buildings, etc.

Two courses have also been arranged by the L.S.B. at 24, Aire-street, Leeds, 1, whence tickets and programmes may be obtained. The evening course will be held at Lincoln Technical College, and the afternoon course at the Yorkshire Electricity Board's offices in Bradford.

New Lighting Installations

Control Room

As the first stage in the electrification of the British Railways, Eastern Region, lines from Wath and Sheffield to Manchester, goods traffic is now being worked by electric locomotives between Wath and Dunford Bridge (at the eastern end of the Woodhead Tunnel). The four sub-stations on this section are under remote supervisory control from the electrical control station at Penistone, which eventually will control all 12 sub-stations required for the complete scheme. This electrification is being carried out at 1,500 volts D.C., and when completed will be the first example in Great Britain of a main line with all its traffic, passenger and goods, worked by electric traction.

The control room at the Penistone electrical control station has been equipped with a fluorescent lighting scheme designed by G.E.C., Ltd., in collaboration with the railway authorities. Illumination of the control

The control room at Penistone electrical station lit by 40-watt fluorescent lamps.

Ediswan overlamp dispersive reflectors using 1,000-watt tungsten lamps. The average intensity is 16 lm./ft.^{2} on a working plane 3 ft. above floor level at this engineering factory in Letchworth.

desk is provided by 20 4-ft. 40-watt warm white lamps installed in sets of four above the five panels of a laylight, which is glazed with Morocco diffusing glass. Segments of white flashed opal glass are inserted in the panels to coincide with the ends of the lamps. The panels are hinged for access to the lamps and gear from below.

The illumination on the desk is approximately 34 lm./ft.^{2}, which provides very convenient conditions for manipulation of the control keys and observation of meters. Lighting in the vertical plane for a mimic diagram of the supply system and track layout is also provided by the laylight. The illumination level on the panel is approximately 15 lm./ft.^{2}, which is adequate for observation of the diagram and preserves contrast between the background and the indicator lamps showing the condition of switchgear at the sub-stations.

The general lighting is entirely indirect and is provided by 34 4-ft. 40-watt lamps in a continuous cornice, 122 ft in length, round all four sides of the room. In order that the illumination may be continuous, the lamps are arranged with their ends overlapping. This arrangement, combined with the placing of the lamps at a slight angle to the direction of the cornice so that the centre of each is at the same distance from the wall, results in lighting with no perceptible variations of intensity. The average level of general illumination in the room is 15 lm./ft.^{2}.

Two Industrial Installations

The photographs on the next page show two very neat industrial installations. The upper picture is of the Pontypool Factory of British Nylon Spinners and shows some of the 1,700 Metrovick 5-ft. 80-watt fluorescent lamps and fittings installed in the coning section. An illumination of 25 lm/ft.^{2} is provided on the working surfaces.

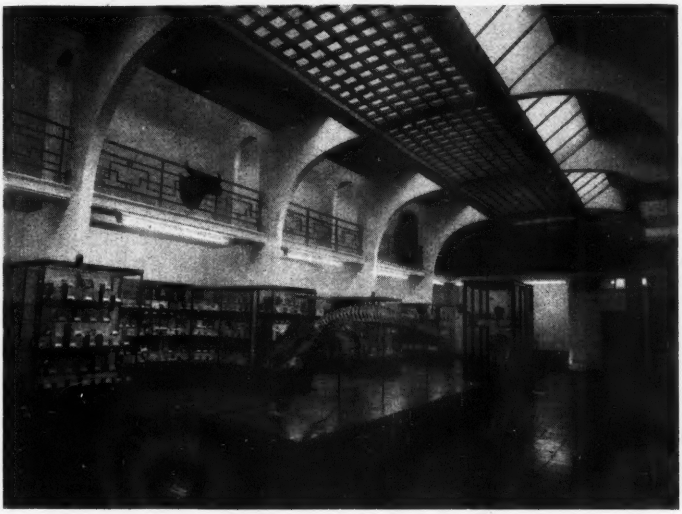
The lower photograph illustrates part of the Turning Department in the new Sundon 3 Factory of the Skefko Ball Bearing Co., Ltd., Luton, which has been equipped recently with a large number of twin 5-ft. 80-watt Benjamin Type "HH" Flurolier Reflectors finished in "Crysteel" vitreous enamel.

In this well-lit machine shop the rows of fittings are all placed in correct relationship to the actual machines and whilst the main illumination is directed downwards, sufficient upward light is provided to prevent any tunnel effect by clearly defining the roof structure.

The general construction of this fitting conforms to the Benjamin Basic plan, and is in two parts—a top wiring channel and a detachable reflector providing the usual 70 deg. transverse cut-off. A special feature is the series of fins on the lower edges of the slots to give a horizontal cut-off to the upward light. The electrical contractors for the installation were Messrs. Rashleigh Phipps and Co., Ltd., London.

Fluorescent lighting at the British Nylon Spinners, Ltd., factory at Pontypool.

The turning department in the Skefko Ball Bearing Co., Ltd., factory at Luton.



Fluorescent lamps installed above the laylight give the main illumination in this museum.

A Natural History Museum

A new museum is the principal feature of some recent additions to the Zoology Department of the University of Southampton. The lighting scheme, planned by the G.E.C., Ltd. in close collaboration with the architects, Messrs. Gutteridge and Gutteridge, has been incorporated with the laylights so that at night time illumination of showcases and exhibits reproduces the conditions of daytime.

Four rows of six trough reflectors with 8-ft. 125-watt Natural fluorescent lamps, mounted in continuous lines, are arranged above the laylight in the main hall. They are positioned so as to obstruct the entry of daylight as little as possible, and to ensure that when the lamps are in use the sloping side panels of the laylight are uniformly and completely flashed.

Additional lighting in the main hall comes from further 8-ft. lamps in batten fittings, positioned so as to provide higher illumination in the areas where display cases are located. The average intensity of the lighting in the hall is 10-12 lm/ft.^{2}.

Angular laylights have been provided for directional lighting of showcases in the gallery. At night, similar directional lighting is provided by 5-ft. 80-watt fluorescent lamps in 16 angle-type one-lamp trough reflectors inside the laylight. Illumination in the gallery averages 8-10 lm/ft.^{2}. The electrical installation was the work of Messrs. F. W. Cook and Co. (Southampton), Ltd.

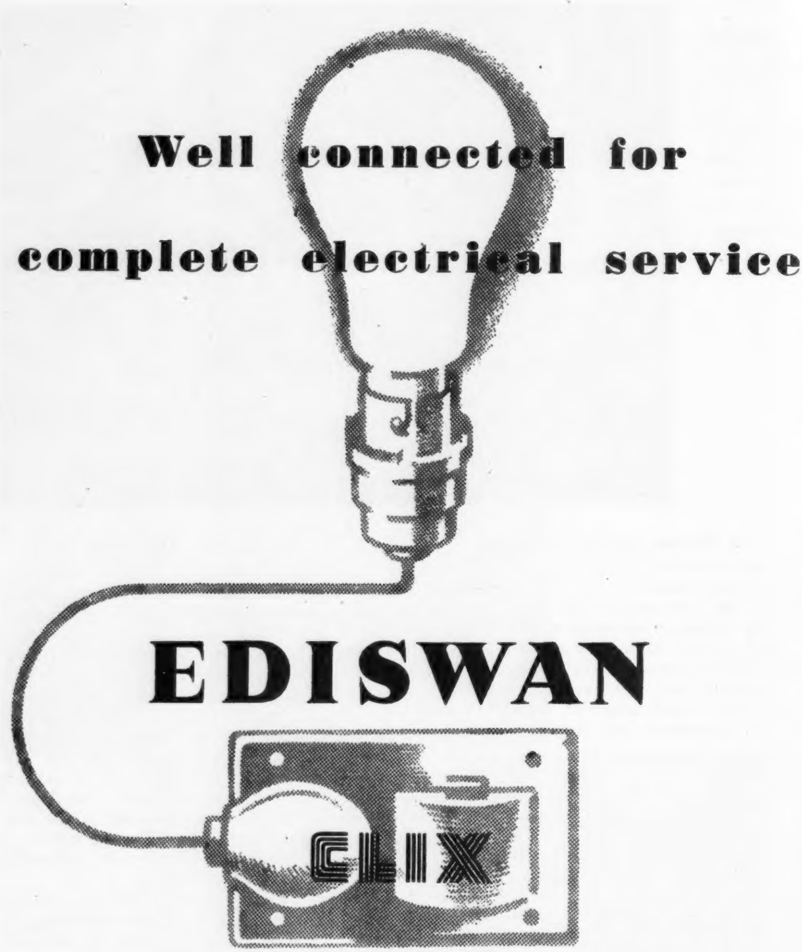
A Bond-street Shoe Shop

This shop, illustrated on page 118, does not follow the general trend of pseudo-classical design generally associated with this famous shopping area, but rather has a character of its own. The shop is divided into two sections; the front half has virtually no window display and is used chiefly for reception and appraisal. Thus the level of illumination has been kept very low and maximum brightness concentrated on displays. This effect was achieved by using a pattern of specially designed "starlight" fittings for general lighting and, in the case of the display at the windows, by means of Conalite fittings with 150-watt internally silvered lamps.

The wall displays behind the counters are lit with a dual-purpose fitting, consisting of 150-watt pearl lamp and reflector with the main source of light directed downward, plus the inclusion of a specially designed reflector to take a 24-volt auto spotlamp, this being directed toward the wall displays.

The rear salon is lit by means of semi-recessed purpose-made downliter fittings, giving a general key of lighting over the whole area. Fittings of particular interest are the diabolo units illuminating the main display wall.

The architect was Ellis E. Somake, F.R.I.B.A., Dipl. Arch. (Lond.), staff architect to Messrs. Upsons, Ltd. Fittings were supplied by Courtney, Pope (Electrical) Ltd., and the shopfitters were Courtney, Pope Ltd.


Well connected for
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EDISWAN
CLIX

Correspondence

Street Lighting

To the Editor, LIGHT AND LIGHTING

Sir,—The article by Penny and Clack in your November issue was of considerable interest to me. Since the Sydney County Council, in which organisation I am the Street Lighting Engineer, has nearly 40,000 street lamps, including 3,000 mercury lamps, to maintain and has bulk replaced its filament lamps every quarter since July, 1933, it may be of interest to your other readers to know on what basis this procedure was adopted and its results. The mercury lamps, incidentally, are not bulk replaced but are changed on a lumen depreciation basis.

Why is it that the practice of replacing the cheaper filament lamps after a reasonable economic life is not adopted more widely by those undertakings having a large number of street lamps to maintain? Surely it cannot be only for the reason given by Penny and Clack that "human nature, with strong Victorian traditions behind it, is apt to rebel at the idea of scrapping an article which still operates." It is true, of course, that the precise economic "scrapping" point varies with a number of factors—some of rather vague and indeterminate nature—but is it necessary to be precise?

It is not difficult to show that, in replacing filament lamps on "burn-out," the lamp failures per week cannot be less than 8 per cent. of the number in service and, in practice, this figure is likely to be between 10 and 12 per cent. per week. With a bulk replacement schedule of four replacements a year, it is quite possible to reduce the lamp failures to 1 per cent. per week.

If the rated life of the lamps is 1,000 hours, the bulk replacement must be undertaken not later than 800 hours for the maximum benefit in reliability. If the life is 1,350 hours (as all filament lamps for street lighting purposes should be rated) the replacement period must not be greater than 1,080 hours. This happens to be near enough to four times a year on an "all night every night" basis, and is convenient for the arrangement of other maintenance work as well.

With regard to the economic question, it should be quite clear that the labour of replacement is much greater than the lamp cost, and that when a lamp is "scrapped" after four-fifths of its life, its theoretical value is only one-fifth of its initial cost.

Suppose, for example, that the supply authority which bulk replaces all its filament lamps four times a year spends £10,000 per annum on the day maintenance of, say, 10,000 filament lamps, and that 20 per cent. of the time thus used is taken up in replacing the premature failures. Then the cost of replacing the premature failures is £2,000 per annum or an average of 8s. per lamp on the assumption that 1 per cent. fail per week, or 50 per cent. per annum. The cost of replacing lamps individually at burn-out must be at least eight times this figure for weekly failures of 8 per cent., i.e., £16,000.

Thus, in this hypothetical case, it is actually cheaper to adopt the practice of bulk replacement, for such would probably not exceed £10,000 per annum, plus the cost of replacing premature failures already estimated at £2,000 per annum.

Figures such as these would be readily available in any large supply undertaking and it would, therefore, be comparatively easy to determine, for any particular Authority, whether bulk replacement would be an economical practice. Without the calculation of any precise "scrapping" point an advantageous scheme may be introduced. But, even if it does not prove economical, due to unusual circumstances, it should still be seriously considered as one of the best means of improving the service by a considerable increase in the continuity of lamp operation.

—Yours, etc., H. G. FALLON.
B.E., A.M.I.E. (Aust.), F.I.E.S. (Aust.).
Sydney, Australia.

To the Editor, LIGHT AND LIGHTING

Sir,—We would like to reply to the letter from Mr. D. T. Waigh and Mr. G. Fahey, which was published in the February issue, concerning our article, "Lamps for Street Lighting."

The principal object of our article was to show that in any given situation the economic life of a lamp is determined by its lumen maintenance, and we hope that our readers were left with no doubts or feelings of vagueness on this point. We repeat that increases in the life of fluorescent, or for that matter any discharge, lamps are of little use unless they are accompanied by improvements in lumen maintenance. Evidence that the Americans are as aware of this as we are is to be found in the paper presented by Mr. Erwin F. Lowry at the meeting of the Commission Inter-

nationale de l'Eclairage in Stockholm last year.

We have at our disposal a considerable amount of data concerning the performance of American fluorescent lamps, and would like to point out that the figures given in our article refer to 5-ft. 80w. lamps, and not 4-ft. 40w. lamps. Four-ft. 40w. fluorescent lamps generally have better lumen maintenance than 5-ft. 80w. ones, and we happen to know that at least one British manufacturer is producing 4-ft. 40w. lamps with lumen maintenance comparable to that being claimed for similar American lamps.

We agree that a nominal average life of 4,500 hours is most desirable if group replacement is to be carried out at 3,500 hours, and can assure your correspondents that at least one British manufacturer has been producing 5-ft. 80w. lamps, which are the ones most commonly used for street lighting, with an average life in excess of 4,500 hours for some time now.

We quite agree that the economic time for lamp replacement depends on the rate at which the light output of the fitting falls due to dirt accumulation; in fact we said so in our article, and we also agree that in practice conditions vary very widely. We do not agree, however, that the figure of 35 per cent. taken in our example was unreasonably high.

The last paragraph in your correspondents' letter raises an interesting point, but we would like to refute any suggestion that the theory upon which our example was based either could not, or should not, apply in the case of "midnight switching." We think that a maintenance plan should be worked out for the lantern and the "part-night" lamps, and that the "all-night" lamps should be treated as a separate installation, but with their maintenance and group replacement adjusted to coincide with the maintenance of the lantern and "part-night" lamps.—Yours, etc.,

A. G. PENNY.
London. F. J. G. CLACK.

To the Editor, LIGHT AND LIGHTING.

Sir,—Referring to the letter by Messrs. Waigh and Fahey in which they ask how the all-night lamps and half-night lamps should be treated in fluorescent street lighting installations where the economy switching is used, the general practice is to regard them as separate installations for obvious reasons, so that full life shall be obtained from the lamps which are turned off at about midnight.

Whilst I agree that such an arrangement may tend to complicate group replacement, I think the complication is over-rated in that any type of street lighting lantern must have regular maintenance work carried out on it and since the tower wagon and maintenance men will have to visit each point at reasonable intervals, it is generally possible to make the lamp-changing coincide with these times. Obviously the fact of switching down to perhaps only one lamp at midnight results not only in a very great reduction in lamp costs but in electricity consumption as well, and in many cases a combination of these two economies has tipped the balance in favour of fluorescent street lighting purely on the score of economics which can be set down on paper as against other forms of street lighting.—Yours, etc.,

London. H. E. G. WATTS.

Lighting Terms

To the Editor, LIGHT AND LIGHTING.

Sir,—I nearly laughed like anything at Lumeritas' ecclesiastical remarks about foot-candles. But seriously, will he or some other learned pundit tell us why a lumen per square foot is better than a foot-candle? If he won't accept a foot-candle because it is not self-explanatory, how can he accept a foot-lambert which is even less so? When he means candles-per-square-inch does he have to write lumens-per-steradian-per-square-inch? If the explanation has appeared somewhere years ago it doesn't matter—let's have it again. I suspect there isn't one, except that some eminent member produced the idea in a moment of temporary insanity, and no one present had sufficient nerve to squash it as it deserved.

I can see a candle, sir. I can even visualise it if I must. But a lumen I can neither see, hear, feel, taste nor smell. Nevertheless, a lumen per square foot positively stinks. Up Mr. Bessemer and the other foot-candleers. —Yours, etc.,

London. "DIMWIT."

To the Editor, LIGHT AND LIGHTING

Sir,—Lumeritas, in his February "Postscript," while deprecating the term "foot-candle" on the score that it might be differently appreciated by various observers, gives us no "visual idea" of the unit he prefers. From his anxieties about observers who place their eye one foot from an unshielded candle and who use coloured objects when testing the effect of such a source, one would assume that he holds the intelligence of the average mortal in unusually low regard.—Yours, etc.,

London. R. R. HOLMES.

National Illumination Committee

The Editor, LIGHT AND LIGHTING

Sir,—I thank Dr. Walsh for his courteous reply to my criticism of the composition of the list of officers of the National Illumination Committee and the British representation on the Commission Internationale de l'Eclairage. May I say just this: gas is concerned with only a very limited field of lighting. It is right that its nominees should have a voice on relevant bodies, but I suggest that, generally speaking, they should be in the rank-and-file, not dominant among the officers year after year.—Yours, etc.,

B. BESEMER.

London.

The Chatham Bus Accident

To the Editor, LIGHT AND LIGHTING

Dear Sir,—When some comment was made on the above subject in the "Postscript" of the January issue, the matter was still *sub judice*. It is to be regretted that it has since been decided *not* to hold an enquiry into the accident and it would be even more regrettable if this resulted in there being no further investigation in respect of the street lighting.

There was much comment at the time on the poverty of the lighting, but after personal inspection I would say that it has to be seen to be believed! It so happened that I was near Chatham within a few days of the tragic mishap and I took the opportunity of making a careful inspection of the lighting under conditions of darkness similar to those obtaining on the night of the accident.

The lighting fittings are of a quality, candlepower, height, and spacing that would hardly be deemed adequate nowadays for the quietest by-way, and yet such lighting is provided for a wide road which is the main access to the dock gates. Besides a regular bus service there is, of course, much other vehicular traffic, and, at times, large numbers of pedestrians entering or leaving the docks. The conditions are considerably worsened by the existence of high walls in dark brickwork on both sides of the road, and no attempt has been made to mitigate the effect by whitening these walls. Even under the atmospheric conditions at Chatham, a light surface could surely have been maintained—at least above shoulder height.

The lighting of the main streets in Gillingham and Chatham is quite modern in character and gives good visibility, but this naturally only accentuates the contrast when turning from the main road into the road leading to the dock. Under the present lighting here, a pedestrian on the pavement disappears from view almost immediately after passing under a lamp-post, and it would be utterly impossible for a motorist to drive with any confidence unless powerful headlamps were in use.

If these conditions are permitted in such an area one cannot but feel that some minimum standard of lighting should be legally enforced, although the difficulties of such a step are fully appreciated.—Yours, etc.,

ARTHUR CUNNINGTON.

Pulborough, Sussex.

Forthcoming I.E.S. Meetings

LONDON

April 8th
Sessional Meeting. "The Present Position of Luminescence as applied to Lighting," by A. H. McKeag and H. G. Jenkins. (At the Lighting Service Bureau, 2, Savoy Hill, W.C.2.) 6 p.m.

May 20th-23rd
Summer Meeting at Eastbourne.

CENTRES AND GROUPS

April 1st
CARDIFF—"Safety and Vision—Industrial Lighting," by E. W. Murray. (At the Demonstration Theatre, South Wales Electricity Board.) 5.45 p.m.

LIVERPOOL—"New Discharge Lamps—The Extension of the Gas Arc Condition," by H. W. Cumming. (At the Lecture Theatre, Merseyside and North Wales Electricity Board's Service Centre, Whitechapel, Liverpool.) 6 p.m.

STOKE-ON-TRENT—"Light in the Aid of Crime Detection," by C. H. Edlin. (At 31, Kingsway, Stoke-on-Trent.) 6 p.m.

April 2nd
SWANSEA—"Electric Lighting and Contractors' Viewpoint," by J. Parker. (At the Minor Hall, Y.M.C.A., Swansea.) 6.30 p.m.

NEWCASTLE—Annual General Meeting, followed by E.D.A. Film on lighting. (At the Minor Durrant Hall, Oxford Street, Newcastle-on-Tyne, 1.) 6.15 p.m.

April 3rd
MANCHESTER—"Fluorescent Lamps for the Lighting of Stage and Auditorium," by J. W. Strange. (At the Demonstration Theatre, Manchester Town Hall Extension.) 6 p.m.

NOTTINGHAM—"Artificial Lighting for Cinema Studios," by E. J. G. Beeson. (At the Demonstration Theatre, East Midlands Electricity Board, Smithy Row, Nottingham.) 5.30 p.m.

April 4th
BATH and BRISTOL—Annual Luncheon and Presidential Address. (At the Royal Hotel, College Green, Bristol.)

HUDDERSFIELD—Annual General Meeting. (At the Electricity Showroom, Market Street, Huddersfield.) 7.15 p.m.

April 18th
BIRMINGHAM—"Light from Space," by W. Wilson. (At the Imperial Hotel, Temple Street, Birmingham.) 6 p.m.

April 21st
SHEFFIELD—Presidential Address. (At the Medical Library, The University, Western Bank, Sheffield, 10.) 6.30 p.m.

April 24th
BRADFORD—"Hospital Lighting," by J. K. Frisby. (At the Yorkshire Electricity Board, 45-53, Sunbridge Road, Bradford.) 7.30 p.m.

April 28th
LEEDS—Annual General Meeting, followed by an Address given by a Vice-President, I.E.S. (At the Lighting Service Bureau, 24, Aire Street, Leeds, 1.) 7 p.m.

I.E.S. ACTIVITIES

Visit

A visit will take place on the afternoon of April 23 to the Amalgamated Press, Ltd., at Sumner-street, London, S.E.1, to see colour-printing operations. Those wishing to take part should apply to the I.E.S. Secretary.

London

At the Sessional Meeting in London on March 11 a paper entitled "The Lighting of Shipyards" was presented by Mr. J. S. McCulloch, of Newcastle-on-Tyne.

The author pointed out that before 1939 lighting in shipyards lagged behind the progress made in the younger industries, but that during and since the last war shipbuilders have realised that good artificial lighting can have beneficial results on production, and much progress has been made. As very little information on the lighting of shipyards has been published, the paper discussed the requirements for the artificial lighting of shipbuilding shops and outside working areas, with particular emphasis on the latter, and described methods by which these requirements have been met in some shipyards on the north-east coast.

The requirements are divided into three headings: (i) Interior lighting, (ii) Lighting of outside areas, and (iii) Lighting of building berths.

The sequence of operations in shipbuilding was shown on a chart and a description given of the type of work carried out in the various shops concerned with the preparation of material for the building of ships on the berths. The author gave details of typical lighting installations for mould lofts, plate preparation shops, frame shops and assembly shops. It was stated that supplementary lighting is not required in these shops, provided the general lighting installation is well designed and meets certain minimum illumination values, except for one or two special conditions such as the marking-off tables and plate-edge planers in plate-preparation shops, and plate benders and straighteners in the assembly shops.

In addition to workshops, the working area of shipyards consists of large outside areas, such as outside assembly areas, plate and bar racks, building berths and fitting-out quays, and if the five-day working week is imposed on the shipbuilding industry, shipyard managements will have to provide artificial lighting for these outside working areas of such quantity and quality that work can continue as near normally as possible well into the hours of darkness during the winter months. The author described the working conditions in these areas, and explained the problems illuminating engineers have to solve in providing artificial lighting to meet the shipbuilders' requirements. A complete scheme of outside lighting for a large shipyard on the north-east coast was described in some detail and recommended values of illumination for the various areas were given.

The number of ships a yard can build per annum is limited, in normal conditions, by the length of time the ships occupy the building berths, and the future of artificial lighting in shipyards depends on how illuminating engineers solve the problem of lighting the outside working areas. It is clear in the author's opinion that outside lighting for working areas is economically practicable except for the building berths, and for these he described an installation which offers a compromise solution, though he admitted that it had limitations.

Birmingham

A large audience of members and visitors was attracted to the February meeting of the Birmingham Centre by the knowledge that the speaker for the evening, Dr. E. H. Norgrove, has a reputation for always having something worth while to say as well as for rather unconventional plain speaking and common sense. Dr. Norgrove introduced his paper by stating categorically that this was not an authoritative paper on "Industrial Lighting" but was an approach to the matter from the point of view of a user.

He said the best light for almost every purpose was natural light. This was controversial since factories have been built where all natural light is excluded, and it is argued that uniform artificial light is better than the "hit and miss" arrangements provided by nature. He thought this argument was nonsense and did not understand why uniformity should be a goal so devoutly

sought. In spite of the architects' efforts, daylight was not always available, and it was then that the illuminating engineer had to help.

Speaking of light sources, he said that the tungsten filament lamp was still the most important commercial light source, but deprecated the constant multiplication and variation of different types. He would like to see the bayonet cap abolished, and said it was a nuisance and only tolerated from habit and temporary convenience.

Turning to fluorescent lamps, he claimed that there were a totally unnecessary number of varieties. In the right place it was a good lamp, but no universal panacea.

Making what he called " candid comments," Dr. Norgrove said fittings designers should be compelled to have experience of their own products and lighting plans should allow for structural arrangements and show fixing and switching details. The flexible cord-drop was stupid and dangerous.

Summarising, the author said he wanted illuminating engineers to get both feet back on the ground, to shed some self-esteem, and enlarge their common-sense angle. He also advised the forcible suppression of amateur advisers on illuminating engineering.

As can be imagined, brisk discussion followed and everyone present thoroughly enjoyed this " delightfully condemnatory but stimulating paper," as Mr. P. Hartill referred to it in his vote of thanks.

Edinburgh and Glasgow

The Edinburgh and Glasgow Centres each held their annual dinner at the beginning of March and each was attended by the President and Mrs. Holmes and the Secretary, Mr. G. F. Cole.

At Edinburgh some 80 members and guests were present, and the chair was taken by Mr. C. K. Ross, chairman of the Centre. The toast of "The Guests" was proposed by Dr. H. Buckley, a past president of the Society, who said the Edinburgh members were very glad to welcome the President and Secretary. Mr. Holmes, in the course of his remarks, drew the attention of members to the facilities offered by the Society for student members, including the Silver Jubilee Award and the recently announced Dow Prize Competition.

The Glasgow dinner was the first one at which ladies had been present, and the innovation proved most successful. The chair was taken by Mr. C. J. King, who read a letter from Mr. A. B. Wright, who, though now recovering from a long illness, was not able to be present. The President also asked members of the Glasgow Centre to do their utmost to promote more interest in students. The guests were welcomed by Mr. F. Dunnett and Mr. G. F. Cole replied.

Nottingham

At the March meeting of the Nottingham Centre members and visitors heard a lecture given by Mr. B. S. Cooper on "Invisible Radiations from Illuminants."

Mr. Cooper, with slides and demonstrations, lucidly explained the nature of the radiations lying on each side of the visible spectrum. At the lower end were the near ultra-violet (4,000 A to 3,000 A), transmitted to a greater or less extent by glass and present in sunlight; the shorter wavelength ultra-violet (3,000 A to 2,000 A) transmitted by quartz and likely to produce undesirable effects on the eye and skin; and the vacuum ultra-violet (below 2,000 A)—the latter being outside the scope of the lecture as they are absorbed by air. The longer wave-length radiations comprised the near infra-red (up to 1.5 microns) not appreciably absorbed by air; the longer wavelength band from 1.5 μ to 4.0 μ which are strongly absorbed by water; and the range above 4 μ which are absorbed almost entirely by glass.

Mr. Cooper showed spectral energy curves of various light sources, i.e., the tungsten lamp, the various lamps employing electrical discharges through mercury vapour, the fluorescent lamp, the totally enclosed carbon arc and the high-intensity carbon arc. Having explained the sources and existence of these invisible radiations, the speaker then proceeded to demonstrate how various media such as ordinary and special glass, quartz, water and air modify these radiations. It was interesting to note that life on earth would be highly unpleasant but for the presence of ozone, water vapour and carbon-dioxide in the upper atmosphere which absorb most, if not all, of the more dangerous ultra-violet and infra-red radiations from the sun.

The action of certain of these radiations on the human body, plants, photographic processes, accelerated fading tests, etc., were then described, and the speaker explained the various devices used to facilitate industrial processes. He described their use to the analytical chemist, the forensic researcher, the medical therapist, and their uses in connection with the sterilisation of air and liquids, the polymerisation of plastics and the printing of photographs. In these instances when using either ultra-violet or infra-red radiations, there is no need to exclude the other radiations given out by the chosen

source, as they have no effect on the process. In cases, however, involving fluorescence, such as certain stage effects and the identification of "traces" in substances, where the final assessment is based on visual inspection, Wood's glass filters or a coloured phosphate base glass filter are used to eliminate the visible light from the incident beam which would otherwise be reflected back. There are other applications such as the "burglar alarm" system and infra-red telescopes, where visible radiations must be rigorously excluded, and the lecturer gave details of how infra-red emanations are used in these particular instances. In conclusion, Mr. Cooper dealt briefly with the influence these same radiations had on plant life.

The discussion was opened by Mr. C. E. Gimson, of the University of Nottingham, and was taken up by many members and visitors present.

Sheffield

A special meeting of the Sheffield Centre was held recently when Mr. P. Corry, manager of the Strand Electric Co., Ltd., Northern Area, gave a lecture on stage lighting. Over 350 members and visitors were present, including the chairman of the Watch Committee, the manager of No. 3 Sub-Area Yorkshire Electricity Board, the Director of Education, Mr. Wellwood Ferguson, a vice-president of the Society, theatre managers, and many representatives of amateur dramatic societies.

Pupils of a Sheffield school of dancing gave dancing demonstrations illustrating the effect of directional light and colour, and the principles that govern the use of lighting in the creation of the world of illusion that the theatre audience enjoys. Some colourful effects were obtained with the application of "black light" on fluorescent-treated costumes worn by the girls.

A vote of thanks to Mr. Corry was proposed by the chairman (Mr. G. L. Tomlinson) for his very excellent and entertaining lecture.

At the February meeting of the Centre, Mr. J. Ashmore spoke on lighting from the contractors' point of view. A number of electrical contractors were present and joined in the discussion.

Erratum

The lighting fittings in the restaurant of the Free Trade Hall, Manchester, which was illustrated on p. 93 of our March issue, were supplied by The Merchant Adventurers, Ltd., to whom we apologise for omitting this information.

I.E.S. Summer Meeting

Golf Competition

During the I.E.S. Summer Meeting at Eastbourne in May a competition for the Dow Golf Cup will again be organised. The rules for the competition are as follows:—

1.—The Competition is open to any member of the Illuminating Engineering Society, who is a member of a recognised Golf Club.

2.—The Competition will be played on the Stableford System over 18 holes. To the points thus accumulated the Competitor will add three-quarters of his lowest club handicap.

3.—Competitors may take out as many cards as they please between the dates May 20, 23, 1952, at a fee of 2s. 6d. per card. Cards may be obtained, on payment of the fee, from the Golf Committee consisting of Messrs. C. R. Bicknell, N. Boydell and C. W. M. Phillips or from the I.E.S. Office at Eastbourne, and must be returned to any member of the Golf Committee as soon as possible after completion of the round. No cards returned after 12 noon on May 23 will be counted in the Competition.

4.—Competitors must pay the necessary green fees direct to the Steward of the Royal Eastbourne Golf Club before starting play.

5.—All rounds must be played in strict accordance with the Rules of Golf and with the local rules of the Royal Eastbourne Golf Club.

6.—The maximum handicap allowance will be 24, i.e., no player may receive more than 18 points allowance.

7.—Two points will be deducted from the gross score of any player who is a member of the Royal Eastbourne Golf Club.

8.—Ties will be decided on the last 9 holes or, if necessary, the last 6 or the last 3 holes.

9.—A Member of the Golf Committee will be available at the Conference Hall 15 minutes before the commencement of each Conference Session with supplies of score cards.

NOTE.—The Stableford System of scoring allows the following points:—

1 over bogey—1 point
bogey—2 points
1 under bogey—3 points
2 under bogey—4 points

The proceeds of the competition will be divided equally between the Electrical Industries Benevolent Association and the Institution of Gas Engineers Benevolent Fund.

Annual Report of the National Illumination Committee*

By far the most important event in the period under review has been the Twelfth Session of the International Commission on Illumination which took place in Stockholm between June 26 and July 5 under the presidency of Dr. N. A. Halbertsma of Holland. Considerable interest was aroused by the meetings which were attended by about 450 delegates from 22 different countries. Of those present, about 65 were from Great Britain and once again this delegation was the largest from the visiting countries; about 30 of the British delegates were accompanied by their wives

The opening meeting took place in the Concert Hall and was graced with the presence of King Gustav VI; later there were two plenary sessions, as well as numerous technical meetings, most of which were held in the new Technical College. Secretariat reports were presented on the many subjects covered by the Commission's activities and three of these reports came from this country, viz., those on (i) Light Sources; (ii) Calculations on Projector Systems and; (iii) Theatre Stage Lighting. At all meetings, members of the British delegation took an active part in the discussions and in formulating the recommendations. In addition ten papers were presented by members of the British delegation, of which six members acted as chairmen of technical sessions and eight others as reporters or alternate reporters.

The British delegation was led by Dr. S. English, with Mr. F. C. Smith as deputy leader, and in addition leaders and reporters were appointed for each subject. A meeting of delegates was held before the delegation left this country, and copies of most of the secretariat reports and papers were available in pre-print form.

Among the more important matters arising from the meetings were the adoption of a number of definitions and also for the first time of a Relative Scotopic Luminous Efficiency Function (for young eyes). It was also agreed to continue tests on automobile headlights which had previously been held on several occasions since the previous meeting of the Commission. In connection with airfield lighting an *ad hoc* International Committee was set up for the purpose of calculating the performance of approach lighting, Mr. Calvert being appointed as the British representative. Agreement was reached as regards the limiting values of the C.I.E. chromaticity coordinates for red, yellow, green, blue and white signal lights, but this Committee has not felt justified in ratifying one of the limits for blue signal lights. In connection with lighting practice, it was agreed to study the I.E.S. Code as a universally accepted basis for codes of illumination values prepared in different countries. It was also agreed to adopt the initials "C.I.E." as the correct abbreviation for the title of the Commission.

At the concluding plenary meeting, Dr. Ward Harrison (U.S.A.) was elected President, whilst Mr. I. Folcker (Sweden), M. M. Leblanc (France) and Dr. Walsh were re-elected Vice Presidents; Dr. Konig (Switzerland) and Mr. Atherton (U.S.A.) were re-elected to the offices of Hon. Treasurer and Hon. Secretary respectively. It was arranged that the next meeting should take place in Switzerland in 1955.

The Swedish Committee proved themselves to be excellent hosts both as regards the arrangements for meetings and in organising the entertainments. These included a dinner at the City Hall, a sea trip round the Stockholm Archipelago and a visit to Drottningholm Palace.

In order to make suitable arrangements for dealing with the future work of the Commission, a Scope Committee was formed and a suggested re-arrangement of subjects has been put forward to it by this Committee. The report of the Scope Committee which will also determine secretariat responsibility is awaited.

The Central Bureau has continued to issue Halath letters (now to be known as Harath

*Approved at the annual general meeting of the Committee held on Thursday, January 31, 1952.

Constitution of the National Illumination Committee on December 31st, 1951

Officers :—

Chairman : DR. J. W. T. WALSH.

Vice-Chairmen : DR. S. ENGLISH and F. C. SMITH

Hon. Treasurer : DR. S. ENGLISH, Holophane House, Elverton Street, S.W.1.

Hon. Secretary : L. H. McDERMOTT, National Physical Laboratory, Teddington, Middlesex.

Representatives of Great Britain on the Executive Committee of the International Commission on Illumination :
DR. S. ENGLISH and F. C. SMITH.

Nominated by the Sponsoring Organisations:—

Illuminating Engineering Society: DR. J. N. ALDINGTON, G. G. BAINES, J. G. HOLMES, L. H. McDERMOTT, J. M. WALDRAM.

Institution of Electrical Engineers: R. O. ACKERLEY, PROF. H. COTTON, C. W. M. PHILLIPS, H. R. RUFF, DR. J. W. T. WALSH.

Institution of Gas Engineers: J. B CARNE, A. G. HIGGINS, P. RICHBELL, F. C. SMITH, D. M. THOMPSON.

Nominated by the Co-operating Organisations:—

Admiralty : H. A. L. DAWSON.

Air Ministry : J. E. CARPENTER.

Association of Public Lighting Engineers : N. BOYDELL.

British Electrical and Allied Manufacturers' Association : J. M. H. STUBBS.

British Electrical Development Association : V. W. DALE.

British Electricity Authority and its Area Boards : R. BIRT, M. D. STONEHOUSE.

British Plastics Federation : DR. W. E. HARPER.

Department of Scientific and Industrial Research : (*National Physical Laboratory*) DR. L. A. SAYCE, DR. W. S. STILES; (*Building Research Station*) DR. R. G. HOPKINSON.

Electrical Contractors' Association: A. H. OLSON.

Electric Lamp Manufacturers' Association : L. J. DAVIES, W. J. JONES, E. B. SAWYER.

Electric Light Fittings Association : G. CAMPBELL, W. E. J. DRAKE.

Gas Council : J. B. CARNE, F. W. SANSOM.

Glass Manufacturers' Federation : DR. W. M. HAMPTON.

Institution of Municipal Engineers : C. HARPER.

Medical Research Council : PROF. H. HARTRIDGE, H. C. WESTON.

Ministry of Civil Aviation : H. G. LITCHFIELD, J. V. VERRAN.

Ministry of Fuel and Power: H. ROBINSON.

Ministry of Health : D. A. HUGHES.

Ministry of Labour and National Service : M. A. McTAGGART, E. W. MURRAY.

Ministry of Supply: E. S. CALVERT, Brig. E. J. H. MOPPETT, J. L. RUSSELL.

Ministry of Transport: DR. H. F. GILLBE, W. HADFIELD.

Ministry of Works : W. E. RAWSON-BOTTOM.

National Coal Board: D. A. STRACHAN, P. N. WYKE.

Post Office: A. E. PENNEY.

Railway and London Transport Executives : A. J. BULL, H. E. STYLES.

Society of British Gas Industries : S. F. BAKER, P. C. SUGG.

Society of Glass Technology : DR. S. ENGLISH.

letters) and is also arranging to issue the 1951 Proceedings in due course.

On the financial side, the subvention payable by this Committee to the Commission has been raised from £192 to about £300 per annum at the current exchange rate and the Committee of Administration has in consequence decided to ask all co-operating organisations who are associated with or form part of trading associations to raise their annual subscriptions from £10 to £15.

A number of changes of membership has taken place during the year. Mr. W. T. Gemmell of the Post Office and Mr. W. Hodkinson of the Institution of Gas Engineers have retired from membership and have been replaced by Mr. A. E. Penney and Mr. D. M. Thompson respectively. The Ministry of Transport have made an additional nomination in Mr. W. Hadfield, whilst Mr. P. N. Wyke has replaced Mr. R. Crawford as one of the representatives of the National Coal Board. The Ministry of Fuel and Power have now nominated Mr. H. Robinson in place of Mr. P. E. Montagnon, whilst Mr. A. H. Olson now represents the Electrical Contractors Association in place of Mr. C. J. Veness. Dr. Walsh is now one of the representatives of the Institution of Electrical Engineers in place of Mr. H. C. Spence, and Dr. W. S. Stiles has taken Dr. Walsh's place as a representative of the Department of Scientific and Industrial Research.

The thanks of the Committee are once again due to the British Standards Institution for their co-operation in the work preparatory to the meeting of the Commission by making available the work of seven of their technical committees. In this connection it will be of interest to note that during the year the following B.S.I. publications were issued: B.S. 1788: 1951 Street Lighting Lanterns. P.D. 1171: Amendment No. 2 to B.S. 98: Dimensions of screw lamp-caps and lampholders (Edison type). P.D. 1269: Amendment No. 5 to B.S. 555 1939: Tungsten filament electric lamps (other than general service).

J. W. T. WALSH,
Chairman

French Lighting Conference

The annual conference of the Association Française des Eclairagistes is to be held in Toulouse from April 30 to May 4. A very full programme has been arranged under the following headings: Lighting Techniques, Street Lighting, Exterior Lighting, Lighting Applications, Lighting in the U.S.A., and New Developments.

Full details of the meeting can be obtained from the Association Française des Eclairagistes, 33, Rue de Naples, Paris (VIIIe).

Physical Society Exhibition

The thirty-sixth Annual Exhibition of the Physical Society is to be held at Imperial College, South Kensington, from April 4 to 8. Tickets may be obtained from the Physical Society, 1, Lowther Gardens, Prince Consort-road, S.W.7.

POSTSCRIPT

By "Lumeritas"

It may not be generally known among lighting engineers that, under Sec. 15 of the Food and Drugs Act, 1938, there are by-laws requiring the provision of "suitable and sufficient" natural or artificial lighting in connection with the handling, wrapping and delivery of food and the sale or exposure for sale of food in the open air. What is to be considered "suitable and sufficient" lighting is not defined by the Ministry of Food. This is a matter that may have to be decided by the courts in particular cases. Meanwhile, unofficial guidance has been offered by an official of the Ministry of Food, writing in the journal, "Municipal Engineering." This writer instances the standards of lighting in school buildings prescribed by the Minister of Education, the B.S. Code of Practice for Electric Lighting in Schools, the recommendations in the fourth report of the Factory Lighting Committee, and some of the recommendations in the I.E.S. Code (not from the current edition). From these, the writer of the article suggests that in the average food premises suitable and sufficient light may be determined according to the following scale:—

	lm./ft.^{2}
Yards and entry passages, at floor level	1-4
Store rooms, at floor level	2-4
Preparation rooms, at floor level	6-10
Sale rooms, at floor level	6-10
" " at working level	10-15

A lively correspondence has been going on in the columns of the "Daily Telegraph," following upon an article by John Betjeman deprecating the installation of concrete street lamp standards in Marlborough High-street. Unanimity of opinion on a matter of this kind is scarcely to be expected. One of the correspondents concludes his letter as follows: "I cannot see why the lamps should be 25 ft. above the roadway; surely the lights could be lower and closer together. The aim is to light all the ground. The source of light should be concealed, if possible, by means of shades. If this is done the apparent light on the road is greatly increased." The greater installation cost entailed by closer spacing of the lamps is an economic objection to it, but with the last two sentences of the letter I am in complete agreement. I have mentioned before my preference for cut-off street lighting, and I wish we had more of it.

Quite recently the Minister of Transport replied in the House to a number of questions relating to street lighting and road vehicle lights. One reply concerned the illumination of Zebra crossings, about which the Minister said he hoped to make a decision "in a reasonable time." On street lighting, he said there is no strong evidence to show the different types of lighting cause confusion among motorists or that standardising them would necessarily prove efficient. He added that there are difficulties about standardisation, but progress has been made. Replying to another question, the Minister said he had no power to prescribe the size or brilliance of rear lights on road vehicles, but he was considering the desirability of changes in the law on this matter. He said he was not satisfied that there is a sufficient case for amending regulations on headlamps. The problem of dazzle had been studied in this country and elsewhere, but no complete solution had been found. Some people, he said, considered double-dipping equipment to be effective.

Two articles recently published in other journals have interested me considerably for their comments upon fluorescent "fittings." One of these articles was contributed to a house journal by an architect, and the other was written by the Lighting Correspondent to the magazine "Display." The architect draws attention to the necessarily large size of suspended fluorescent "fittings," and says, "Lit, or unlit, such fittings tend to be *over-assertive*, and when scattered over a large area the visual result can be both distracting and boring." . . . "Due to the *unavoidably assertive* qualities of many fittings—especially those which are suspended—the tendency to style the basic forms is to be deplored." . . . "This self-conscious form of gilding the lily increases the already *assertive* quality of the fitting out of all proportion to its importance and is, alas, too frequently pretentious and more in the vernacular of the American car than in the static and considered language of architecture." The other writer says: "The demand for something a little more decorative has led in recent years to a spate of fittings most of which resemble either punts or waffles." Compared with earlier fittings the newer ones "carry even more decoration and are even *more conspicuous*." The italics are mine. Both writers consider the best use of fluorescent tubes to be in "concealed lighting." Do these articles portend a general revolt against fittings conspicuity? There is a recommendation in the I.E.S. Code (para. 18) to the effect that "lighting units" should, in general, be unobtrusive.

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